Isolation and characterization of pullulan-degrading anoxybacillus species isolated from Malaysian hot springs

Abstract :

Two thermophilic bacteria (SK3-4 and DT3-1) were isolated from the Sungai Klah (SK) and Dusun Tua (DT) hot springsin Malaysia. The cells from both strains were rod-shaped, stained Gram positive and formed endospores. The optimal growth of both strains was observed at 55°C and pH 7. Strain DT3-1 exhibited a higher tolerance to chloramphenicol (100 μgml -1) but showed a lower tolerance to sodium chloride (2%, w/v) compared to strain SK3-4. Phylogenetic analysis based on 16S rRNA gene sequences revealed that both strains belong to the genus Anoxybacillus. High concentrations of 15:0 iso in the fatty acid profiles support the conclusion that both strains belong to the genusAnoxybacillus and exhibit unique fatty acid compositions and percentages compared to other Anoxybacillus species. The DNA G+C contents were 42.0mol% and 41.8 mol% for strains SK3-4 and DT3-1, respectively. Strains SK3-4 and DT3-1 were able to degrade pullulan and to produce maltotriose and glucose, respectively, as their main end products. Based on phenotypic and chemotaxonomic characteristics, 16S rRNA gene sequences, and the DNA G+C content, we propose that strains SK3-4 and DT3-1 are new pullulan-degrading Anoxybacillus strains.